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To: Mr. A.M. Wilson
Manager
Hydraulic Generation Services
Thermal and Hydraulic Generation Division

SOUTH FALLS - UNITS 2 AND 3
TURBINE PERFORMANCE TEST - ELECTRICAL RESULTS

W.S. Fischer

Turbine Performance Tests were performed at South Falls, Units 2 and 3 on May 28 and 29, 1986. The electrical test results contained in this report have been corrected for all metering errors except those which may originate in the station instrument current and potential transformers.

As requested by Mike Ching of Hydraulic Generation Services, Research Division personnel performed the necessary electrical measurements to determine the generator electrical output power and the turbine output horsepower during Turbine Performance Tests at South Falls, Units 2 and 3. The units were operated at unity power factor over a range of wicket gate openings. Power was integrated for four minute intervals during a twenty minute test run coincident with waterflow measurements. Appendices A and B contain the corrected generator and turbine outputs.

Electrical power was measured using a Scientific Columbus digital watt/watthour transducer, S/N 3788, connected in a two-element, three-wire configuration. As noted in the attached calibration, Ontario Hydro Research Division Report No EC86-191-K, the transducer was calibrated after the completion of the tests in the Standards Laboratory, Electronics and Instrumentation Section of the Electrical Research Department, to an accuracy of ±0.1%. The calibration factors have been applied to the appropriate electrical measurements.

The maximum error in the generator electrical output measurements does not exceed ±0.1% excluding the current and potential transformer errors. These transformers were not calibrated and no correction factors were available for them.

job	file	date	report no.
18-155-501	813.11	October 17, 1986	86-247-K

The generator turbine horsepower is calculated as shown below. Generator losses are obtained from the manufacturer through the Hydraulic Plant Equipment Department.

$$\text{Turbine Power} = \frac{(\text{Generator Output} + \text{Generator Losses})\ \text{kW}}{0.746}\ \text{HP}$$

Approved:

A.F. Baljet
Manager
Electrical Research Department

Submitted:

W.S. Fischer
Technician
System Studies Section

WSF:td

May 29, 1986

APPENDIX A

SOUTH FALLS - UNIT NO 2

Run #	Time	Generator Output(kW)	Generator Losses (kW)	Turbine Output (HP)
1	10:40	237.0	20	344.5
2	11:00	351.1	22	500.1
3	11:20	466.9	25	659.4
4	11:40	566.9	28	797.5
5	12:00	599.7	30	844.1
6	12:20	606.2	30	852.8
7	14:00	601.7	30	846.8
8	14:20	574.3	28	807.4
9	14:40	459.9	25	650.0
10	15:00	606.2	30	852.8*
11	15:20	572.1	28	804.4
12	15:40	601.9	30	847.1
13	16:00	605.8	30	852.3
14	16:20	358.9	22	510.6
15	16:40	250.2	21	363.5
*16	17:00	00.0	18	24.1
motoring#1	12:27	-55.3	18	50.0
motoring#2	16:56	-67.3	18	66.1

*speed no load

May 28, 1986

APPENDIX B

SOUTH FALLS - UNIT NO 3

Run #	Time	Generator Output(kW)	Generator Losses (kW)	Turbine Output (HP)
1	10:00	794.6	59.1	1144.4
2	10:20	1168.1	61.5	1648.3
3	10:40	1373.4	63.0	1925.5
4	11:00	1543.3	64.3	2155.0
5	11:20	1637.6	67.9	2286.2
6	11:40	1677.5	69.5	2341.8
7	12:00	1645.6	68.2	2297.3
8	13:40	1593.7	64.8	2223.2
9	14:00	1409.3	63.1	1973.7
10	14:20	1696.3	70.4	2368.2
11	14:40	1566.6	64.4	2186.3
12	15:00	1651.0	68.4	2304.3
13	15:20	1695.5	70.3	2367.0
14	15:40	1150.1	61.4	1624.0
15	16:00	829.2	59.4	1191.2
*16	16:09	00.0	53.0	71.1
motoring#1	9:39	-251.6	53.0	266.3
motoring#2	12:06	-264.3	53.0	283.2
motoring#3	16:18	-252.3	53.0	271.2

*speed no load

Ontario Hydro Research Division

instrument calibration report

to	Mr. D.F. Townshend System Studies Section Research Division
instrument	Watt/Watthour Transducer
serial no.	Lab No 3788
nameplate data	Scientific Columbus Watt/Watthour Standard Model DL34-2K5-A2-6070 5 A 120 V 60 Hz 1500 W 3 element 3 phase 4 wire 1 mA dc into 0 to 10 k ohm
received from	System Studies Section
date received	May 29, 1986

Calibration by Standard Watthour Meter (SC1) on Balanced Three Phase Load 1.0 pf 60 Hz
Ambient Temperature 23 C

Test Current (Amperes)	Test Voltage (Volts)	Percentage Registration
1.0	111.0	99.87
1.5	111.0	99.87
2.0	111.0	99.88
2.5	111.0	99.88
3.0	111.0	99.88
3.5	111.0	99.88
0.5	115.0	99.85
0.75	115.0	99.86
1.0	115.0	99.88
1.25	115.0	99.87
1.5	115.0	99.87

The transducer was connected 2 element (red & blue) 3 phase.

The percentage registration was based on the digital readout and the time set by the internal interval timer.

The accuracy of the calibration is estimated to be ±0.1 percentage registration.

Approved:	Certified:	Tested:
R.D. Brown	M. Sein	G.L. Grant
Supervising Engineer	Supervising Technologist	Technologist

standards laboratory - electronics and instrumentation section - electrical research department

next calibration scheduled for:	file	date	report no.
	815.11(P)	June 2, 1986	EC86-191-K